

African Trypanosomiasis Resistance in Cattle by A Transgenic Approach



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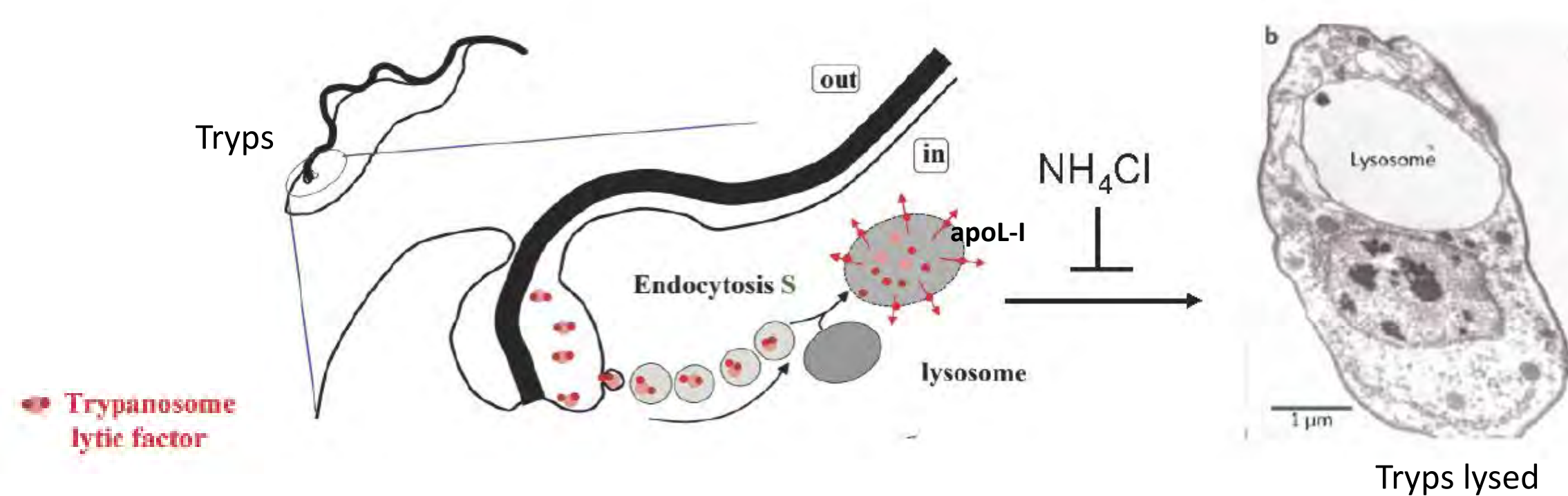
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Introduction

We propose a new strategy for creating resistance in cattle to African trypanosomiasis, a major disease that affects agricultural production in broad regions of Africa.

The long-term aim is to generate genetically modified cattle, which carry a gene that imparts resistance to African trypanosomes. The gene, APOL1, encodes the key trypanolytic component of Baboon's protective Trypanosome Lytic Factor (TLF) against both cattle and human-infective trypanosomes. TLFs are only found in humans, gorillas, sooty mangabys, mandrills and baboons and govern resistance to different African trypanosome species. Baboons are remarkably resistant to all African trypanosomes due to baboon TLF, specifically baboon apoL-I.



L. Vanhamme & E. Pays. Intl J Parasitology, 34 (2004), 887-898

Materials and methods

Using apoL-1 transfected bovine embryonic fibroblasts and the technique of somatic cell nuclear transfer (cloning), to establish a transgenic cattle model with resistance to African Trypanosomiasis on the background of the Kenyan indigenous breed – **Kenyan Boran**.

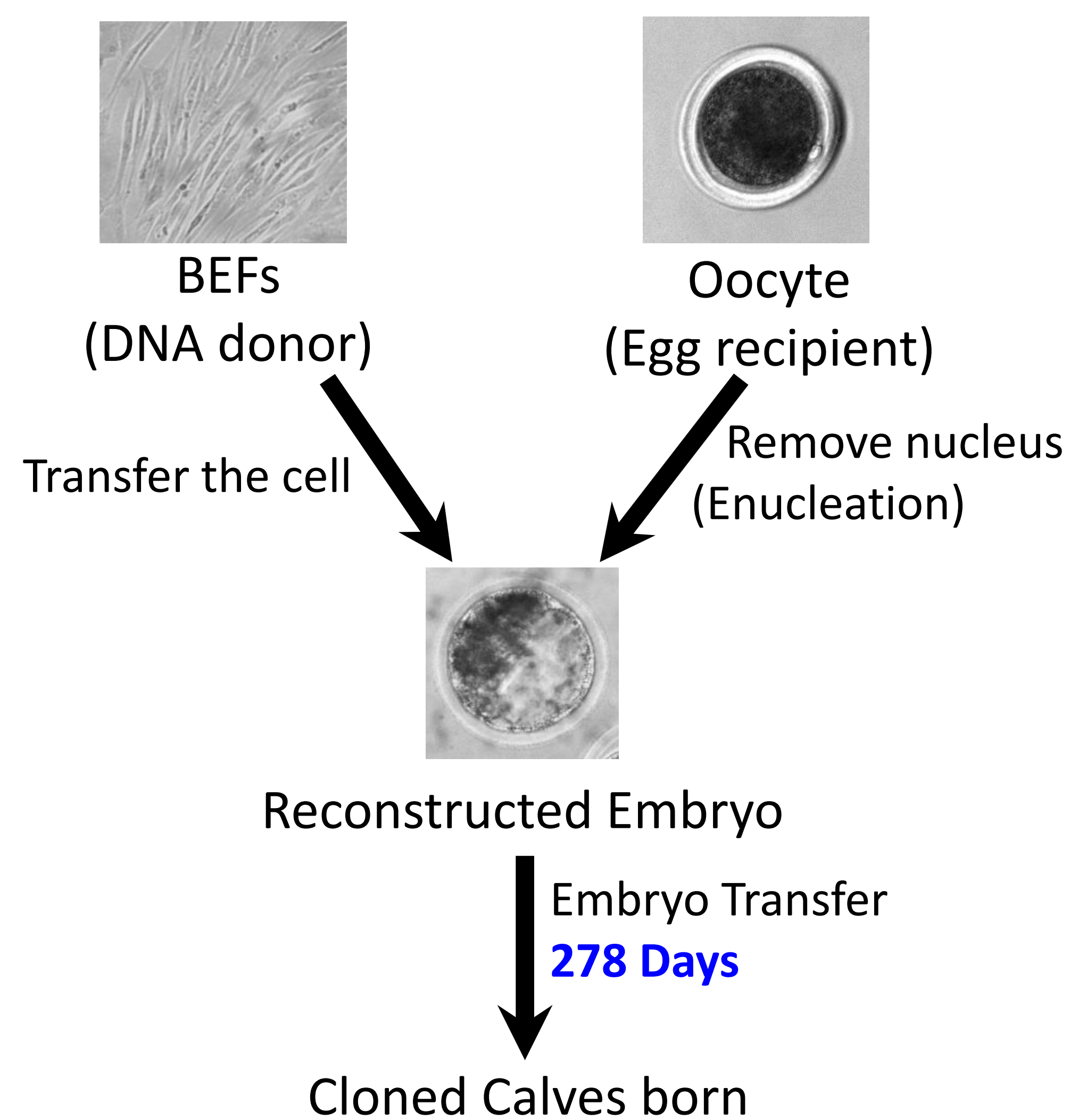
Results

- ✓ Eleven (6 female & 5 male) Kenyan Boran bovine embryonic fibroblasts (BEFs) were established.
- ✓ Two cloned calves (male) were born using one line of the BEFs.
- ✓ One cloned calf survives up to date (15-month old) and is in good condition.
- ✓ This is the first time that Kenyan Boran was cloned, demonstrating that this breed is suitable for cloning.
- ✓ Attempts are ongoing to introduce apoL-1 gene into two lines of the BEFs for future production of a transgenic calf.

Expected impacts on farmers

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- **Trypanosome resistant cattle** will survive in the tsetse belt of Africa (10 million square miles) and reduce the transmission of human infective trypanosomes causing human sleeping sickness.
- **Increased crop production:** the farmers, especially the women who till the land by hand (90% of sub-Saharan Africa) can use cattle for haulage, traction and soil fertility.
- **More food and nutrition:** less vulnerable to critical harvest time imposed by plants.
- **More income:** have a store of wealth for future investments.

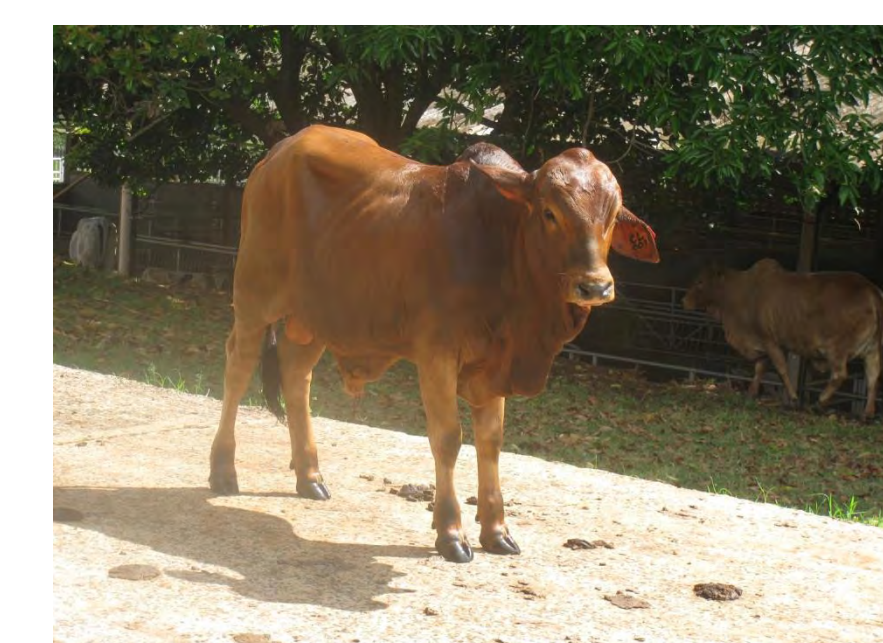


ID Tatu



ID Tumaini (CL001)

Survived 3 days



15-month



RESEARCH PROGRAM ON Livestock and Fish

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